

Amendments to the Claims:

This listing of claims replaces all prior versions, and listings, of claims in this application.

Listing of Claims:

1. (Withdrawn) A battery comprising:
at least one metallic lithium or lithium alloy anode;
at least one cathode,
and a polyimide-based electrolyte separator disposed between said at least one metallic lithium or lithium alloy anode and said at least one cathode; said polyimide-based electrolyte separator comprising a soluble polyimide, a lithium salt, and from about 10% by weight to about 60% by weight of solvent.
2. (Withdrawn) A battery as defined in claim 1 wherein said polyimide-based electrolyte separator comprises from about 15% by weight to about 50% by weight of solvent.
3. (Withdrawn) A battery as defined in claim 1 wherein said polyimide-based electrolyte separator comprises from about 20% by weight to about 40% by weight of solvent.
4. (Withdrawn) A battery as defined in claim 1 wherein said solvent is selected from the group consisting of N,N-methylpyrrolidinone (NMP), gammabutyrolactone, and sulfamides of formula; $R_1R_2N-SO_2-NR_3R_4$, in which R_1 , R_2 , R_3 and R_4 are alkyls having between 1 and 6 carbon atoms and/or oxyalkyls having between 1 and 6 carbon atoms or combinations thereof.

5. (Withdrawn) A battery as defined in claim 1 wherein said at least one cathode comprises a current collector, an active material; an electronic conductive filler; and an ionically conductive electrolyte polyimide binder; wherein said electrolyte polyimide binder comprises a lithium salt and a pre-imidized soluble polyimide, and wherein the lithium salt and the pre-imidized soluble, polyimide are soluble in a polar solvent.
6. (Withdrawn) A battery as defined in claim 1 wherein said at least one cathode comprises a current collector, an active material; an electronic conductive filler; an ionically conductive electrolyte polyether and a lithium salt.
7. (Withdrawn) A battery as defined in claim 6 wherein said active material is selected from the group consisting of: LiCoO_2 ; LiMnO_2 ; LiMn_2O_4 ; LiNiO_2 ; LiV_3O_8 ; V_2O_5 ; $\text{Li}_4\text{Ti}_5\text{O}_{12}$ and LiFePO_4 .
8. (Withdrawn) A battery as defined in claim 5 wherein said active material is selected from the group consisting of: LiCoO_2 ; LiMnO_2 ; LiMnzO_4 ; LiNiO_2 ; LiV_3O_2 ; V_2O_5 ; $\text{Li}_4\text{Ti}_5\text{O}$ and LiFePO_4 .
9. (Withdrawn) A battery as defined in claim 1 wherein said lithium salt is selected from the group consisting of lithium tetrafluorosulfonimide, lithium salts derived from bis perhalogenoacyl and bis sulfonylimide, LiCl , LiBr , LiI , $\text{Li}(\text{ClO}_4)$, $\text{Li}(\text{BF}_4)$, $\text{Li}(\text{PF}_6)$, $\text{Li}(\text{AsF}_6)$, $\text{Li}(\text{CH}_3 \text{ CO}_2)$, $\text{Li}(\text{CF}_3 \text{ SO}_3)$, $\text{Li}(\text{CF}_3 \text{ SO}_2)_2 \text{ N}$, $\text{Li}(\text{CF}_3 \text{ SO}_2)_3$, $\text{Li}(\text{CF}_3 \text{ CO}_2)$, $\text{Li}(\text{B}(\text{C}_6 \text{ H}_5)_4)$, $\text{Li}(\text{SCN})$, and $\text{Li}(\text{NO}_3)$.

10. (Withdrawn) A battery as defined in claim 1, wherein said battery holds an electric charge.
11. (Withdrawn) An electrolyte comprising a soluble polyimide, a lithium salt, and from about 10% by weight to about 60% by weight of solvent.
12. (Withdrawn) An electrolyte as defined in claim 11 comprising from about 15% by weight to about 50% by weight of solvent.
13. (Withdrawn) An electrolyte as defined in claim 11 comprising from about 20% by weight to about 40% by weight of solvent.
14. (Withdrawn) An electrolyte as defined in claim 11 wherein said solvent is selected from the group consisting of N,N-methylpyrrolidinone (NMP), gamma-butyrolactone, and sulfamides of formula; $R_1R_2N-SO_2-NR_3R_4$, in which R_1 , R_2 , R_3 and R_4 are alkyls having between 1 and 6 carbon atoms and/or oxyalkyls having between 1 and 6 carbon atoms or combinations thereof.
15. (Currently Amended) A process for preparing a battery, the process comprising the steps of:
 - a. preparing a metallic lithium or lithium alloy sheet;
 - b. preparing a cathode slurry comprising an active material; an electronic conductive filler; a lithium salt and an ionically conductive electrolyte binder;

- c. preparing an electrolyte solution comprising a soluble polyimide, a lithium salt, and from about 10% by weight to about 60% by weight of solvent by first preparing a precursor electrolyte solution comprising about 70% to 95% solvent and thereafter partially drying the solution to evaporate a portion of the solvent;
- d. applying said cathode slurry onto a first side of a current collector to form a cathode film;
- e. applying said electrolyte solution onto said cathode film to form an electrolyte separator;
- f. applying said metallic lithium or lithium alloy sheet onto said electrolyte separator to form an electrochemical ~~cell~~ cell.

16. (Original) The process as defined in claim 15 further comprising the step of crosslinking of the polyimide electrolyte by exposing said polyimide electrolyte to thermal energy, UV radiation or electron beam.

17. (Original) The process as defined in claim 15 further comprising the steps of:

- a. applying said cathode slurry onto a second side of said current collector to form a second cathode film;
- b. applying said electrolyte solution onto said second cathode film to form a second electrolyte separator; thereby forming a bi-face electrochemical cell;
- c. stacking a plurality of bi-face electrochemical cell to form a battery.

18. (Previously Presented) A process for preparing a battery, the process comprising the steps of:
- a. preparing a metallic lithium or lithium alloy sheet;
 - b. preparing a cathode slurry comprising an active material; an electronic conductive filler; a lithium salt and an ionically conductive electrolyte binder;
 - c. preparing an electrolyte solution comprising a soluble polyimide, a lithium salt, and from about 70% by weight to about 95% by weight of solvent;
 - d. applying said cathode slurry onto a first side of a current collector to form a cathode film;
 - e. applying said electrolyte solution onto said cathode film;
 - f. drying said electrolyte solution to evaporate from 10% by weight to 80% by weight of said solvent to form an electrolyte separator comprising from about 10% by weight to about 60% by weight of solvent;
 - g. assembling said metallic lithium or lithium alloy sheet onto said electrolyte separator to form a battery.
19. (Original) The process as defined in claim 18 further comprising the step of crosslinking of the polyimide electrolyte by exposing said polyimide electrolyte to thermal energy, UV radiation or electron beam.
20. (Original) The process as defined in claim 19 further comprising the steps of:

- a. applying said cathode slurry onto a second side of said current collector to form a second cathode film;
- b. applying said electrolyte solution onto said second cathode film to form a second electrolyte separator and drying said electrolyte solution to evaporate from 10% by weight to 80% by weight of said solvent to form an electrolyte separator comprising from about 10% by weight to about 60% by weight of solvent; thereby forming a biface electrochemical cell;
- c. stacking a plurality of bi-face electrochemical cell to form a battery.

21. (Withdrawn) A battery comprising:

at least one anode;

at least one cathode,

and a polyimide-based electrolyte separator disposed between said at least one anode and said at least one cathode; the polyimide-based electrolyte separator comprising a cross linked polyimide matrix, a lithium salt, and from about 10% by weight to about 60% by weight of solvent.

22. (Withdrawn) A battery as defined in claim 21 wherein said polyimide-based electrolyte separator comprises from about 15% by weight to about 50% by weight of solvent.

23. (Withdrawn) A battery as defined in claim 21 wherein said polyimide-based electrolyte separator comprises from about 20% by weight to about 40% by weight of solvent.

24. (Withdrawn) A battery as defined in claim 21 wherein said solvent is selected from the group consisting of N,N-methylpyrrolidinone (NMP), gamma-butyrolactone, and sulfamides of formula; $R_1R_2N-SO_2-NR_3R_4$, in which R_1 , R_2 , R_3 and R_4 are alkyls having between 1 and 6 carbon atoms and/or oxyalkyls having between 1 and 6 carbon atoms or combinations thereof.
25. (Currently Amended) A process for manufacturing a battery, the process comprising the steps of:
- a. preparing an electrolyte solution comprising a soluble polyimide, a lithium salt, and from about 10% by weight to about 60% by weight of solvent by first preparing a precursor electrolyte solution comprising about 70% to 95% solvent and thereafter partially drying the solution to evaporate a portion of the solvent;
 - b. applying a cathode slurry comprising an active material, an electronic conductive filler, a lithium salt and an ionically conductive electrolyte binder onto a first side of a current collector to form a cathode film;
 - c. applying said electrolyte solution onto said cathode film to form an electrolyte separator;
 - d. cross-linking the electrolyte solution by exposing the polyimide electrolyte to UV radiation; and
 - e. applying a metallic lithium or lithium alloy sheet onto said electrolyte separator to form an electrochemical cell.

26. (Previously Presented) The process of claim 25, further comprising adding a crosslinkable comonomer to the electrolyte solution.
27. (Previously Presented) The process of claim 26, further comprising adding a cross-linking initiator.
28. (Previously Presented) The process of claim 25 further comprising the steps of:
 - a. applying said cathode slurry onto a second side of said current collector to form a second cathode film;
 - b. applying said electrolyte solution onto said second cathode film to form a second electrolyte separator; thereby forming a bi-face electrochemical cell;
 - c. stacking a plurality of bi-face electrochemical cell to form a battery.
29. (Previously Presented) The process of claim 25, wherein said solvent is selected from the group consisting of N,N-methylpyrrolidinone (NMP), gamma-butyrolactone, and sulfamides of formula; $R_1R_2N-SO_2-NR_3R_4$, in which R_1 , R_2 , R_3 and R_4 are alkyls having between 1 and 6 carbon atoms and/or oxyalkyls having between 1 and 6 carbon atoms or combinations thereof.
30. (Previously Presented) The process of claim 25, wherein said lithium salt is selected from the group consisting of lithium tetrafluorosulfonimide, lithium salts derived from bis perhalogenoacyl and bis sulfonylimide, LiCl, LiBr, LiI, Li(CIO₄), Li(BF₄), Li(PF₆),

Li(AsF₆), Li(CH₃ CO₂), Li(CF₃ SO₃), Li(CF₃ SO₂)₂ N, Li(CF₃ SO₂)₃, Li(CF₃ CO₂),
Li(B(C₆ H₅)₄), Li(SCN), and Li(NO₃).

31. (Previously Presented) The process of claim 25, wherein said active material is selected from the group consisting of: LiCoO₂; LiMnO₂; LiMn₂O₄; LiNiO₂; LiV₃O₈; V₂O₅; Li₄Ti₅O₁₂ and LiFePO₄.
32. (Previously Presented) The process of claim 16, wherein the step of crosslinking the electrolyte solution comprises:
- a. adding a crosslinkable comonomer to the electrolyte solution; and
 - b. adding a cross-linking initiator.
33. (Previously Presented) The process of claim 16, wherein said solvent is selected from the group consisting of N,N-methylpyrrolidinone (NMP), gamma-butyrolactone, and sulfamides of formula; R₁R₂N-SO₂-NR₃R₄, in which R₁, R₂, R₃ and R₄ are alkyls having between 1 and 6 carbon atoms and/or oxyalkyls having between 1 and 6 carbon atoms or combinations thereof.
34. (Previously Presented) The process of claim 16, wherein said lithium salt is selected from the group consisting of lithium tetrafluorosulfonimide, lithium salts derived from bis perhalogenoacyl and bis sulfonylimide, LiCl, LiBr, LiI, Li(CIO₄), Li(BF₄), Li(PF₆),

Li(AsF₆), Li(CH₃ CO₂), Li(CF₃ SO₃), Li(CF₃ SO₂)₂ N, Li(CF₃ SO₂)₃, Li(CF₃ CO₂),
Li(B(C₆ H₅)₄), Li(SCN), and Li(NO₃).

35. (Previously Presented) The process of claim 16, wherein said active material is selected from the group consisting of: LiCoO₂; LiMnO₂; LiMn₂O₄; LiNiO₂; LiV₃O₈; V₂O₅; Li₄Ti₅O₁₂ and LiFePO₄.
36. (Currently Amended) The process of claim 16, wherein the electrolyte solution comprises ~~comprise~~ from about 15% by weight to about 50% by weight of solvent.
37. (Previously Presented) The process of claim 16, wherein the electrolyte solution comprises from about 20% by weight to about 40% by weight of solvent.
38. (Currently Amended) A process for manufacturing a battery, the process comprising the steps of:
- a. preparing an electrolyte solution comprising a soluble polyimide, a lithium salt, and from about 10% by weight to about 60% by weight of solvent by first preparing a precursor electrolyte solution comprising about 70% to 95% solvent and thereafter partially drying the solution to evaporate a portion of the solvent;
 - b. applying a cathode slurry comprising an active material, an electronic conductive filler, a lithium salt and an ionically conductive electrolyte binder onto a first side of a current collector to form a cathode film;

- c. applying said electrolyte solution onto said cathode film to form an electrolyte separator;
 - d. cross-linking the electrolyte solution by exposing the polyimide electrolyte to heat; and
 - e. applying a metallic lithium or lithium alloy sheet onto said electrolyte separator to form an electrochemical cell.
39. (Previously Presented) The process of claim 38, further comprising adding a crosslinkable comonomer to the electrolyte solution.
40. (Previously Presented)) The process of claim 38, further comprising adding a cross-linking initiator.
41. (Previously Presented) The process of claim 38, further comprising the steps of:
- a. applying said cathode slurry onto a second side of said current collector to form a second cathode film;
 - b. applying said electrolyte solution onto said second cathode film to form a second electrolyte separator; thereby forming a bi-face electrochemical cell;
 - c. stacking a plurality of bi-face electrochemical cell to form a battery.
42. (Previously Presented) The process of claim 38, wherein said solvent is selected from the group consisting of N,N-methylpyrrolidinone (NMP), gamma-butyrolactone, and

sulfamides of formula; $R_1R_2N-SO_2-NR_3R_4$, in which R_1 , R_2 , R_3 and R_4 are alkyls having between 1 and 6 carbon atoms and/or oxyalkyls having between 1 and 6 carbon atoms or combinations thereof.

43. (Previously Presented) The process of claim 38, wherein said lithium salt is selected from the group consisting of lithium tetrafluorosulfonimide, lithium salts derived from bis perhalogenoacyl and bis sulfonylimide, LiCl, LiBr, LiI, Li(CIO₄), Li(BF₄), Li(PF₆), Li(AsF₆), Li(CH₃ CO₂), Li(CF₃ SO₃), Li(CF₃ SO₂)₂ N, Li(CF₃ SO₂)₃, Li(CF₃ CO₂), Li(B(C₆ H₅)₄), Li(SCN), and Li(NO₃).
44. (Previously Presented) The process of claim 38, wherein said active material is selected from the group consisting of: LiCoO₂; LiMnO₂; LiMn₂O₄; LiNiO₂; LiV₃O₈; V₂O₅; Li₄Ti₅O₁₂ and LiFePO₄.